CLAIMS

1. A micro-oscillation element comprising:

an oscillation section;

a main frame; and

a first spring and a second spring that cause the oscillation section to be supported by the frame;

wherein the oscillation section is located between the first spring and the second spring, each of the first spring and the second spring being deformable along with oscillation of the oscillation section.

2. The micro-oscillation element according to claim 1, further comprising: a first actuating section connected to the frame via the first spring; a second actuating section connected to the frame via the second spring; a first thin section connecting the oscillation section and the first actuating section; and a second thin section connecting the oscillation section and the second actuating section;

wherein the first and the second actuating sections are located between the first and the second springs, the oscillation section being located between the first and the second actuating sections, each of the first and the second actuating sections being movable in moving directions of the oscillation section, the first spring being deflectable as the first actuating section is displaced, the second spring being deflectable as the second actuating section is displaced.

3. The micro-oscillation element according to claim 1, wherein the first and the second springs are plate springs.

4. The micro-oscillation element according to claim 1, further comprising at least one torsion bar for defining an oscillation axis of oscillation of the oscillation section.

5. The micro-oscillation element according to claim 4, wherein the torsion bar has a cross-shape in a cross-section orthogonal to the oscillation axis.

6. The micro-oscillation element according to claim 4, wherein at least one of the first spring, the second spring and the torsion bar is formed with at least one hole.

7. The micro-oscillation element according to claim 4, wherein at least one of the first spring, the second spring and the torsion bar has a nonconstant width.

8. The micro-oscillation element according to claim 4, wherein at least one of the first spring, the second spring and the torsion bar has a nonconstant thickness.

9. The micro-oscillation element according to claim 1, further comprising: a base section connected to the frame; and a third spring connecting the base section and the oscillation section.

10. The micro-oscillation element according to claim 9, wherein the third spring has a pair of notches spaced from each other in a direction in which the first and the second springs are spaced from each other.

11. The micro-oscillation element according to claim 1, further comprising an actuator for generating a driving force causing oscillation of the oscillation section.

12. The micro-oscillation element according to claim 11, wherein a difference between a frequency of the driving force generated by the actuator and a resonance frequency of the oscillation of the oscillation section is 1% or less of the resonance frequency.

13. The micro-oscillation element according to claim 1, wherein the oscillation section is provided with a mirror face for reflecting light.

14. The micro-oscillation element according to claim 1, further comprising: a second frame disposed outward of the main frame; and third and fourth springs connecting the second frame to the main frame;

wherein the main frame is located between the third spring and the fourth spring, each of the third and the fourth springs being deformable along with oscillation of the main frame.

15. The micro-oscillation element according to claim 14, wherein a direction in which the first and the second springs are spaced from each other intersects a direction in which the third and the fourth springs are spaced from each other.

16. The micro-oscillation element according to claim 15, further comprising: at least one torsion bar defining a first oscillation axis of oscillation of the oscillation section; and at least one torsion bar defining a second oscillation axis of oscillation of the main frame.

17. The micro-oscillation element according to claim 16, wherein the first oscillation axis and the second oscillation axis intersect.

18. The micro-oscillation element according to claim 17, wherein the first oscillation axis and the second oscillation axis intersect each other at 90°.